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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in Tampon Applicators

We, JOHNSON & JOHNSON, a Corporation of the State of New Jersey, United States of America, of 501 George Street, New Brunswick, New Jersey, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to tampon applicators for introducing tampons intravaginally and more particularly to tampon applicators which include an outer tube for containing a tampon and a tampon-ejecting plunger longitudinally movable in the outer tube and retained in position with respect to the outer tube. In its more particular aspects, the invention relates to a tampon applicator of the type comprising a pair of telescoped tubes.

The tampon applicator of this invention incorporates improvements directed to maintaining the outer tube and the tampon-ejecting plunger in their telescopically associated relationship so that the plunger does not become readily disassociated from the outer tube. When, in one form of the invention, the tampon applicator contains a tampon to provide a complete unit ready for use, the tampon can be positioned to further assist in maintaining the plunger and the outer tube in their telescopically arranged relationship. As an additional feature thereof, the tampon-ejecting plunger and the tampon are so associated that play and wobble in the applicator are reduced and ejection of the tampon from within the outer tube begins as soon as or directly after the plunger is moved within the outer tube towards the tampon. A further advantage of the device of this invention is the reduction in the tendency of the ends of the withdrawal cord, with which a tampon is customarily provided, from becoming located or lodged in the interior of the applicator, and hence not readily accessible to the user. The applicator construction is such that

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it may be assembled and also associated with a tampon by high-speed manufacturing techniques while reducing the incidence of separation of the plunger from the outer tube during such processing and thereafter.

The tampon applicator of this invention includes an outer tube adapted to receive a tampon, and a tampon-ejecting plunger (preferably in the form of an inner tube) telescopically positioned within the outer tube and longitudinally movable therein. The inner surface of the outer tube is provided with a first protuberance, e.g. a circumferential rib or bead, located inwardly from its front end in proximity to the inner end of a tampon when positioned in the outer tube, and a second protuberance on its inner surface spaced rearwardly from the first protuberance, the plunger being dimensioned to move freely in sliding contact with the protuberances and having a preformed outwardly extending enlargement on its inner end positioned beyond the first protuberance towards the front end, the enlargement being radially larger than the opening defined by the protuberances so as to be engageable by the protuberances. The outer tube and plunger are thus maintained in assembled relationship, thereby reducing the incidence of accidental or inadvertent displacement of the plunger from within the outer tube. By properly locating the first protuberance, the plunger may be maintained an appreciable distance within the outer tube so that the ends of the tampon withdrawal cord extend beyond the outer end of the plunger and remain accessible.

When a tampon is positioned in the outer tube, the location of its inner end, i.e. in a position to engage the enlargement on the inner end of the plunger and hold it against the front edge of the first protuberance on the interior of the outer tube, further retains the plunger and outer tube in associated relationship. The applicator also contains, as already

specified, a second protuberance on the inner surface of the outer tube at a position displaced rearwardly from the first protuberance, and this provides an auxiliary stop for preventing the plunger from being displaced from or from falling from within the outer tube. The outer tube and tampon-ejecting plunger are maintained securely in associated relationship, thus reducing play and wobble between the parts and insuring positive action when the applicator is used.

Reference is made to the accompanying drawings wherein, by way of example, a preferred embodiment of the invention is illustrated.

In the drawings:

Fig. 1 is a perspective view of the tampon applicator containing a tampon to provide a unit ready for use;

Fig. 2 is a sectional view of Fig. 1, on an enlarged scale, taken along lines 2—2;

Fig. 3 is a fragmentary longitudinal, sectional view of the applicator, illustrating the manner in which the plunger and outer tube are telescopically associated prior to insertion of a tampon into the outer tube; and

Fig. 4 is a fragmentary view of the applicator partly in section, illustrating features which provide an auxiliary stop.

Referring to the drawings, the applicator 10 comprises an outer tube 12 and a plunger 14 telescopically associated with the outer tube and longitudinally movable therein. The forward end portion 16 of the outer tube is adapted to receive a tampon 18 with the tampon essentially wholly inserted within the outer tube with the front end 20 of the tampon substantially in alignment with the front end 22 of the tube. The inner surface of the outer tube is provided with an inwardly-extending circumferential rib 24 at a point in proximity to or at the inner end 26 of the tampon.

The plunger is provided at its inner end with an outwardly-extending lip or flange 28 whose outer diameter is slightly greater than the diameter of the opening defined by the circumferential rib 24 on the inner surface of the outer tube so that there is a resistance to the movement of the inner tube through the opening. Due to the nature of the materials used in constructing the applicator, the flange on the plunger may, however, be moved through the opening by the application of a slight force.

The plunger is telescopically positioned within the outer tube with the flange on the end of the plunger positioned beyond the rib in the direction of the forward end portion 16 of the outer tube with the inner or rear surface 30 of the flange in contact with the front surface 32 of the rib. The inner end of the tampon is close to e. g. within about one-quarter of an inch and desirably engages the forward surface of the flange to hold the flange against the forward surface of the rib,

thus maintaining the plunger in position within the outer tube.

With the plunger maintained in position within the outer tube, as described above, the tendency for the plunger to move outwardly is reduced. As a consequence, the ends 34 of the withdrawal cord 36 attached to the tampon extend beyond the outer end of the inner tube. In the case of prior art tampon applicators, the plunger tends to slide outwardly from within the outer tube and, in so doing, covers the ends of the withdrawal cord, thus reducing their accessibility to the user. The applicator of this invention minimizes this tendency.

To position the tampon intravaginally, the plunger is moved longitudinally into the outer tube in the direction of the tampon to push the tampon ahead of it until the tampon is ejected from within the outer tube. With the inner end of the tampon in close proximity to or against the front surface of the flange on the plunger, direct and positive ejection of the tampon occurs when the plunger is moved longitudinally inwardly within the outer tube. The applicator thus provides a firm, positive acting device which effectively aids in properly positioning a tampon in the vagina; there is little or no play between the components.

In high-speed manufacturing operations which involve associating tampon applicators with tampons to provide a complete unit ready for use, it is customary to associate the plunger and outer tube by first placing the plunger part way into the outer tube from one end thereof. The tampon is then positioned in the other end of the outer tube and moved inwardly until it is essentially wholly within the outer tube. During such assembly operations, the plunger frequently moves outwardly and may even fall from within the outer tube and the applicator becomes disassembled and must then be reassembled. By providing the flange on the inner end of the plunger and the rib on the interior of the outer tube in the manner described above, the plunger and outer tube are maintained in telescopic relationship during their assembly and while positioning the tampon within the outer tube.

The outer tube is provided with a supplemental stop means for further preventing disassociation of the plunger from within the outer tube by incorporating a second raised rib or protuberance 38 on the inner surface of the outer tube at or adjacent to the end into which the plunger is inserted. The raised rib or protuberance may be of the same type as that positioned adjacent to the inner end of the tampon and may co-operate in a similar manner with the flange 28 on the plunger to hold the respective parts together. This feature of the second protuberance is of value in the event of the plunger being moved

rearwardly in the outer tube to a point where the flange moves rearwardly past the first protuberance, against which it is normally held. It is also of value in providing a sliding bearing for the plunger.

By way of example, a typical tampon applicator incorporating the invention includes an outer tube about three inches long and a plunger formed by an inner tube of substantially the same length. The raised rib on the interior of the outer tube against which the flange on the inner tube is held by the tampon when a tampon is associated with the applicator is located at a distance of approximately two inches from the forward end of the outer tube, the distance being variable and being substantially equal to the length of the tampon. The second raised rib which acts as a supplemental stop is located on the interior of the outer tube approximately one-eighth of an inch from the opposite end of the outer tube. Each rib on the inner surface of the outer tube extends inwardly from the surface only a short distance, e.g. 0.005 to 0.010 inches, sufficient to define an opening slightly smaller than the diameter of the flange at its periphery so that the flange meets resistance to its movement through the opening.

The outer tube may be made of cardboard or similar paper or paper-like materials, which may be coated or uncoated. An outer tube formed by extruding polyethylene, cellulose acetate, nylon, or other plastic material is particularly suitable in view of the smooth characteristics of its surface which aid in inserting the applicator intravaginally. In view of present day high-speed manufacturing techniques for extruding plastic tubing, tubes made of such plastics are also economically feasible.

The circumferential ribs on the inner surface of the outer tube may be formed by placing the outer tube on a mandrel which is provided with circumferential slots or grooves and then pressing a tool or die or similar device against the outer surface of the outer tube as it is rotated on the mandrel to cause the material from which the outer tube is formed to be forced into the circumferential groove in the mandrel to form the circumferential rib. Simultaneously therewith and with the same tool, or by a separate operation if desired, the outer surface of the end portion of the outer tube customarily held by the fingers in using the applicator may be provided with a roughened surface in the form of ribs 40 to provide a more secure finger-gripping portion. It is thus seen that the applicator of this invention may be simply and economically made. While extruded plastic tubing, such as polyethylene, is preferred because of its plastic properties, and thus readily lends itself to the above-described deformation, cardboard

or paper tubing may be similarly deformed. The plunger, which may also be of extruded plastic tubing, paper, or cardboard, may have its flange formed by a simple flaring operation.

It is apparent that numerous modifications, variations and changes may be made in the foregoing illustrative embodiments of the invention while still remaining within its scope. Other types of protuberances or inwardly-extending members may be provided on the inner surface of the outer tube instead of the described circumferential rib, as for example spaced shoulders, and the enlargement on the inner end of the outer tube may also be of forms other than a lip or flange.

WHAT WE CLAIM IS:—

1. An applicator for introducing catamenial tampons intravaginally comprising an outer tube adapted to contain a tampon, a tampon-ejecting plunger telescopically positioned within said outer tube and longitudinally movable therein, said outer tube having a first protuberance on its interior located inwardly from its front end and in proximity to the inner end of a tampon when positioned in said outer tube, and a second protuberance on its inner surface spaced rearwardly from said first protuberance, said plunger being dimensioned to move freely in sliding contact with said protuberances and having a preformed outwardly extending enlargement on its inner end positioned beyond said first protuberance towards said front end, said enlargement being radially larger than the openings defined by said protuberances so as to be engageable by the protuberances.

2. An applicator according to claim 1, wherein the protuberances on the inner surface of said outer tube are in the form of circumferential ribs and wherein the enlargement on said plunger is in the form of a flange at the inner end of the plunger.

3. An applicator according to claim 1 or 2, wherein said outer tube is formed of deformable extruded synthetic resin or synthetic resin composition tubing and wherein said protuberances are integral with said outer tube and are inwardly extending depressed portions of the wall of said outer tube.

4. An applicator according to claim 1 or 2, wherein the outer surface of the outer tube intermediate said protuberances is roughened to provide a finger-gripping surface.

5. An applicator for introducing catamenial tampons intravaginally constructed and arranged substantially as hereinbefore described and shown in the accompanying drawings.

6. A catamenial device comprising an applicator according to any of the preceding claims and a tampon positioned within the outer tube.

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Fig. 1.

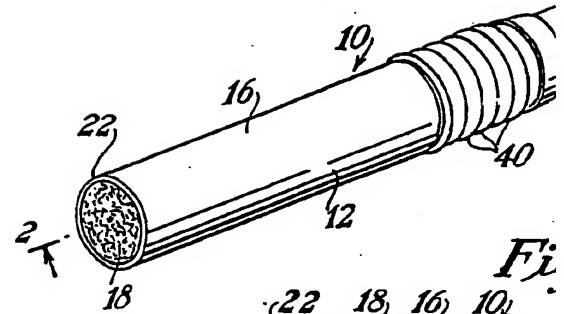
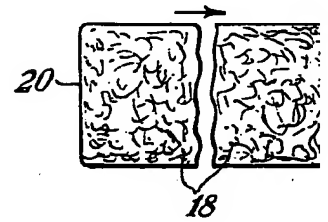
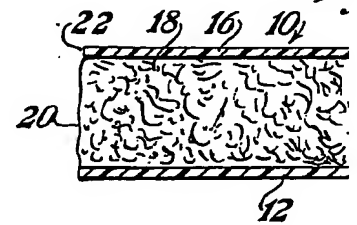


Fig.



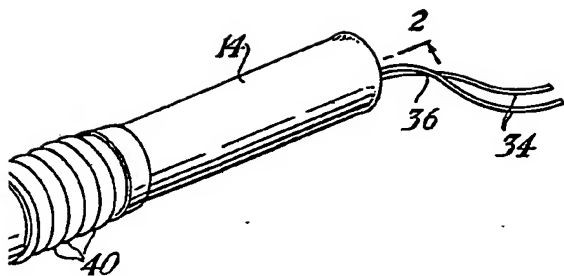


Fig. 2.

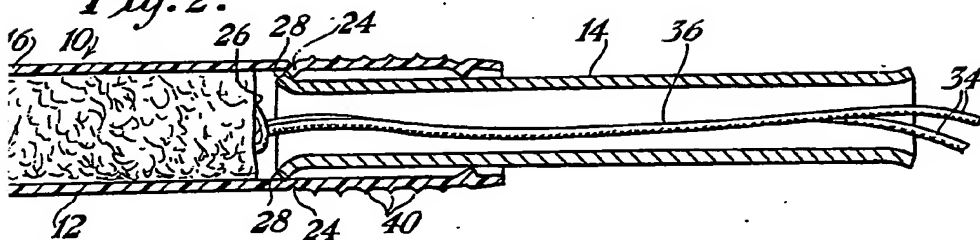


Fig. 3.

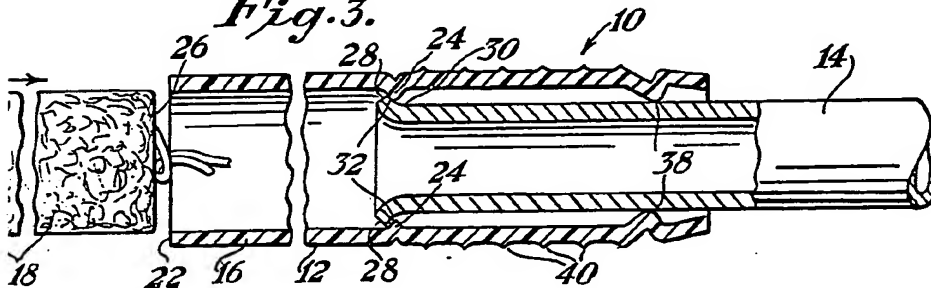


Fig. 4.

